

CSE-Seminar: Numerical Methods for Earthquake and Tsunami Simulation

The seminar will combine three assignments. The students have to prepare a handout and a presentation of their assigned subjects in consultation with their advisors. The handout will be reviewed by other students and their feedback included into a final version, which is due a few weeks later. Talks and deadlines will be oriented towards four seminar sessions.

Seminar outline

Preparation of handout and talk

Each student will have to prepare a paper on his or her topic. The goal is to give an overview of the topic in an understandable form. Appropriate use of images and graphs is encouraged. The extent of the paper should be approximately 8 pages. During preparation, we expect you to have at least two meetings with your advisor:

- 3 weeks before the talk: content outline of handout and talk must be prepared by then
- 1 week before the talk: preparation of the talk must be finished and the handout must be in a finishing state.

Presentation of the Talk

The seminar talks will be given in four sessions. The talks will be grouped by topics. You are explicitly encouraged to coordinate the contents of your talks, if necessary and appropriate. The duration of the talks should be 30–40 minutes at most, allowing 10–15 minutes for questions (during and after the talks). A video projector for laptop presentations is available.

Peer review

In the week after the talk, each paper will be reviewed by two fellow students. Consequently, each student has to review two other papers. The reviews should include

- suggestions for improvements (structure of the paper, missing or superfluous parts, parts that are hard to understand, etc.); this part of the review should cover about one page.
- correction of errors (factual errors, as well as spelling and typing errors)

Update of handout

After the review deadline, each student will receive two reviews. Students should then improve and correct their paper according to the feedback.

Topics for Talks

- Block 1: Model equations and analytical solutions
 - Earthquakes and elastic waves (AB)
 - Nonlinear waves (OM)
 - Shallow Water Equations (KR)
- Block 2: Fluxes and Riemann-solvers
 - Godunov/Roe solvers (AB)
 - F-wave solver (OM)
- Block 3: Towards a full tsunami model
 - 2D/3D equations (OM)
 - Source terms / well-balanced scheme (AB)
 - Inundation (OM)
- Block 4: Higher-order numerical methods
 - Discontinuous Galerkin (basics: weak forms, basis functions) (OM)
 - ADER-DG (OM)
 - Discontinuous Galerkin (applications: SWE, earthquakes) (AB)

Schedule

- Block 1: Model equations and analytical solutions
 - 24.05. Paper deadline
 - 24.05. Presentation of Talks
 - 31.05. Peer review deadline
 - 14.06. Final paper deadline
- Block 2: Fluxes and Riemann-solvers
 - 31.05. Paper deadline
 - 31.05. Presentation of Talks
 - 07.06. Peer review deadline
 - 21.06. Final paper deadline
- Block 3: Towards a full tsunami model
 - 14.06. Paper deadline
 - 13/15.06. Presentation of Talks
 - 21.06. Peer review deadline
 - 05.07. Final paper deadline
- Block 4: Higher-order numerical methods
 - 21.06. Paper deadline
 - 21.06. Presentation of Talks
 - 28.06. Peer review deadline
 - 12.07. Final paper deadline

Submission

Papers and reviews have to be handed in to Oliver Meister in electronic form (PDF).

Grading

Each task of the seminar will be evaluated. The final grade for the seminar will be computed as a weighted average of the individual performances (handout, review, presentation, presentation slides and participation).

Important Note: Especially the grading of your paper will heavily consider your own work in summarising, outlining, and explaining the respective topics. The paper has to be a complete text that you have entirely worked out (and formulated) on your own. Just copies of slides or simply putting together excerpts from papers is not sufficient (even if cited properly).

Website

http://www5.in.tum.de/wiki/index.php/CSE-Seminar_Numerical_Methods_for_Earthquake_and_Tsunami_Simulation